

REMARKS

Claims 3 - 21, and 23 are in the application.

Claims 1, 2, 22, 24 and 25 have been cancelled without prejudice to presentation in a continuing application, and claims 26 and 27 have been withdrawn due to the Examiner's restriction requirement.

The sole remaining independent claim, claim 3, has been amended to require that the outer coating layer mixture be free of void-forming material. As disclosed in the specification at page 3, lines 15-16, the inclusion of a void-forming material in the outer coating layer is optional. Thus, the amended independent claim is fully supported by the application as filed, and introduces no new matter.

Applicants gratefully note that the finality of the last Action has been withdrawn, and the previously entered rejections over Joedicke '639 have been withdrawn in view of the applicants' Rule 131 declaration.

Claims 1-11 and 16-25 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 3,528,842 ("Skadulis") in view of U.S. Patent 4,378,408 ("Joedicke '408"). This rejection is respectfully traversed, and reconsideration and withdrawal of the rejection are respectfully requested as applicable to the amended claims.

The Examiner states that Skadulis discloses a process for producing algae-resistant roofing granules, the process comprising applying to raw mineral granules (identified by the Examiner as the claimed inert base particles, and referencing column 3, lines 44-46) a coating composition containing appropriate pigments generally metal oxides (referencing column 3, lines 30-33) such as titanium dioxide, kaolin clay, sodium silicate followed by firing at 950 degrees Fahrenheit to produce a first coating layer; then

applying to pre-coated granules (referencing column 4, lines 43-48) a coating composition containing appropriate pigments generally metal oxides (referencing column 3, lines 30-33) such as titanium dioxide, kaolin clay, sodium silicate and water-insoluble algaecidal copper compounds such as CuO (identified by the Examiner as the claimed cuprous oxide) in an amount of 2 weight percent (referencing column 4, line 39); then firing the coated granules at 800-1000 degrees Fahrenheit thereby forming a moisture-permeable porous pigmented silicate-clay coating (referencing Example 1; column 2, lines 37-55, 71-72; column 3, lines 1-3, 16-53). The Examiner further states that the water-insoluble algaecidal copper compounds become soluble under acidic conditions and are released from the porous silicate-clay coating in an amount effective to prevent growth of algae on the surfaces (referencing column 2, lines 55-70).

The Examiner observes that Skadulis fails to teach that the coating composition further contains a void-forming material, the void-forming material releasing gaseous material at temperatures above 90 degrees C, and having an average particle size no larger than 2 mm, which form pores upon firing (citing claims 1 and 25).

The Examiner notes that Joedicke '408 teaches that the addition of inexpensive gas-forming compounds such as hydrogen peroxide or sodium perborate (NaBO_3) to a coating composition containing a pigment such as titanium dioxide, kaolin clay, and sodium silicate, greatly enhances film opacity and affords significant pigment reductions, particularly titanium dioxide in whites, where the coating composition is intended to be used as the only coating or as the outer coating on roofing granules, by undergoing chemical and/or thermal decomposition to gaseous products early in the film drying process and resulting in the uniform dispersion of microscopic light-scattering microvoids throughout the film (referencing column 2, lines 17-68; column 3, lines 1-16). The

Examiner further explains that the gas-forming particles should have claimed particle size of less than 2 mm to produce microvoids. The Examiner notes that unfortunately, the voids formed by drying neat silicate films are large and scatter light inefficiently, in addition, the film is weak because the voids are interconnected and the film surface is extensively disrupted (referencing column 2, lines 23-27).

The Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added inexpensive gas-forming compounds such as hydrogen peroxide or sodium perborate to a first and second coating compositions for making algaecidal roof granules in Skadulis with the expectation of providing algaecidal roof granules with the desired enhanced film opacity and significant pigment reductions, as taught by Joedicke '408.

The Examiner further states that as to pore size, thickness and concentration limitations, the Examiner notes that it has been held that it is not inventive to discover the optimum or workable ranges of result-effective variables by routine experimentation, citing In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977), and In re Boesch, 617 R2d 272, 205 USPQ 215 (CCPA 1980).

The Examiner further concludes it would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the optimum values of the relevant pore size, thickness and concentration parameters (including those of claimed invention) in Skadulis in view of Joedicke '408 through routine experimentation in the absence of showing of criticality.

Applicants respectfully contend that this rejection is not applicable to the amended claims, which require that the outer coating layer material be free of void-forming material. Since the postulated motivation to add the void-forming materials to

the coating compositions is to create light-scattering microvoids, one of ordinary skill in the art would not be motivated by the cited combination of prior art references to add a void-forming material to the inner coating layer of a roofing granule having an inner coating layer and an outer layer, since the inner layer would be concealed by the pigmented outer layer.

Thus, the cited combination of references does not make out a *prima facie* case of obviousness with respect to the presently claimed invention. Even were one of ordinary skill in the art to combine the references as suggested by the Examiner, the combination would not read upon the amended claims.

Reconsideration and withdrawal of the rejection of claims 1-11 and 16-25 entered under 35 U.S.C. 103 over Skadulis in view of Joedicke '408, as applicable to the amended claims, are respectfully requested for this reason.

Claims 9, 12 and 13 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Skadulis in view of Joedicke '408, further in view of U.S. Patent 3,507,676 ("McMahon"). This rejection is also respectfully traversed, and reconsideration and withdrawal of the rejection are respectfully requested as applicable to the amended claims.

The Examiner states that Skadulis in view of Joedicke '408 are applied in this rejection for the same reasons as in the first rejection. The Examiner notes that Skadulis in view of Joedicke '408 fails to teach that zinc oxide is used as an algicidal agent.

The Examiner further states that McMahon teaches that ZnO is suitable for the use as algaecide in the coating of roofing granules (referencing column 1, lines 14-15).

The Examiner further notes that it has been held that the selection of a known material based on its suitability for its intended use supported a *prima facie* obviousness

determination in Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945).

The Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used ZnO as algaecide in Skadulis in view of Joedicke '408 since McMahon teaches that ZnO is suitable for the use as algaecide in coating of roofing granules.

Applicants respectfully contend that the cited combination of references does not make out a *prima facie* case of obviousness with respect to the presently claimed invention. Even were the references combined as suggested by the Examiner, there would be nothing to teach or suggest to one of ordinary skill in the art to include void-forming material in the inner coating layer but not in the outer coating layer. McMahon does not add anything to the combination of Skadulis in view of Joedicke '408 in this regard. Accordingly, reconsideration and withdrawal of the rejection of claims 9, 12 and 13 entered over Skadulis in view of Joedicke and McMahon, as applicable to the amended claims, are respectfully requested for this reason.

Claims 14 and 15 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Skadulis in view of Joedicke '408, and further in view of U.S. Patent 4,430,108 ("Hojaji et al."). This rejection is respectfully traversed, and reconsideration and withdrawal of the rejection are respectfully requested as applicable to the amended claims.

The Examiner states that Skadulis in view of Joedicke '408 are applied in this rejection for the same reasons as above in the first rejection. The Examiner notes that Skadulis in view of Joedicke '408 fails to teach that sugar is to be used as a gas-forming material.

The Examiner states, however, that Hojaji et al. teach that sugar is suitable for the use as a gas-forming material (referencing column 8, lines 47-57) in glass compositions for roof shingles (referencing column 4, lines 19-20).

The Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a sugar as gas-forming material in Skadulis in view of Joedicke '408 since Hojaji et al. teach that sugar is suitable for the use as gas-forming material in glass compositions for roof shingles.

Applicants respectfully contend that Hojaji et al. does not supply the teaching or suggestion missing from the combination of Skadulis and Joedicke '408, that void-forming material be included in the inner layer composition but excluded from the outer layer composition. Consequently, the cited combination of prior art references does not make a *prima facie* case of obviousness of the claims as amended.

Reconsideration and withdrawal of the rejection of claims 14 and 15 over Skadulis in view of Joedicke '408 and Hojaji et al. are respectfully requested for this reason.

Applicants respectfully solicit reconsideration, withdrawal of the rejections entered, and an early notice of allowance.

Respectfully submitted,



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